

Remarks

Claims 1-32 and 38-40 are pending. Favorable reconsideration is respectfully requested.

Applicants hereby confirm the election of the Group I claims and Species I-C and II-B. Claims which read upon Species I-C are claims 16, 21, 22, 26, 27, 28, 29 (sub paragraphs c)i) to c)ii)), 30, 32, and 38-40 while claims which read on Species II-B are claims 16, 22, 23, 26, 28, 29, 30, 39, and 40.

Claims 33-37 have been cancelled without prejudice as directed to a non-elected invention. New claims 38-40 have been added. Support for claims 38 and 39, directed to preferred copolymer adhesives, may be found on page 3, line 19 to page 4, line 26.

New claim 40 has been added to recite that the foam particle molding and textile composite is one selected from the group there identified. It should be noted that all these products are of substantial size in 3 dimensions, and of rigid or semi rigid construction. Support may be found on page 1 of the application.

Claim 1 has been amended to more particularly point out and distinctly claim certain aspects of Applicants' invention, i.e. that the molding is performed in a closed mold, as is well known to one skilled in the art, and in view of the specification pages 1-2 and page 7, lines 16-33 and in the examples. The molds used are conventional, and have porous walls (holes, slots, etc.) through which steam and gas can pass, but not polymer beads. The polymer beads are loaded into the mold, usually by air-transport through a conduit, and the mold closed. Superheated steam is then applied, which causes the beads to expand, to press against each other and the mold, and causes their surfaces to partially fuse. Claim 1 is also amended to eliminate the class of polyvinylchloride polymers, which are of low commercial interest, and to recite that the adhesive is free of crosslinker compounds for the adhesive. In Applicants' parent application, of which this application is a continuation, the claims were limited to

adhesives containing a crosslinker compound, i.e. a di- or polyisocyanate, or di- or polyepoxy compound. This optional crosslinker-containing embodiment is described in the specification on page 5, line 32 to page 6, line 25. The present claims are directed to adhesives not containing a separate crosslinker. For the same reason, claim 25, which was inadvertently presented in Applicants' Preliminary Amendment, has been cancelled. Claim 29 has been amended similarly to claim 1. Claim 26 has been amended to delete reference to vinyl chloride polymers, and claim 31, pertaining to a vinyl chloride polymer, has been cancelled. No new matter has been added by virtue of any of these amendments.

The present invention is directed to a process for the preparation of parts molded from expandable polymer beads in a closed mold, to which a textile layer, in virtually all cases, an aesthetic, decorative trim, is adhesively bonded. The bonding may take place by several distinct methods. Currently, species "c" of claims 16 and 29 are being examined. These species require that a molding first be formed in a closed mold, following which the fabric is bonded to the part by heating a pulverant adhesive deposited therebetween.

The adhesive employed in the subject invention is critical; the adhesive must be a copolymer containing, as one comonomer, from 0.01 to 25 weight percent of a carboxylic acid-functional monomer. The adhesive must also have a glass transition temperature greater than 30°C. By selecting such an adhesive, it has been found, very surprisingly, that the heat resistance (delamination resistance) of the subject invention composite laminates is higher than the melt temperature of the adhesive, *see, e.g.*, page 9, first paragraph.

Claims 16, 22, 23, and 26-30 have been rejected under 35 U.S.C. § 103(a) as unpatentable over *Pearson et al.* U.S. Patent 3,783,085 ("*Pearson*") in view of Kimura et al. U.S. 3,841,952 ("*Kimura*") and Shin U.S. Patent 4,761,328 ("*Shin*"). The very age of these references alone, in view of the lack of use of suitable adhesives in applying fabric to foamed moldings prior to Applicants' invention, attests to the non-obvious nature of the subject invention. *In re Lechene*, 125 USPQ 396 (CCPA 1960); *In re Adams*, 148 USPQ 745 (CCPA 1966). Applicants also respectfully submit that the references are not directed to the same

endeavor, nor is there any evidence of motivation to combine which meets present legal standards. In fairness to Applicants, one looking to solve Applicants' problem, lack of thermal delamination resistance of fabric adhesively bonded to a part molded of expandable polymer beads, would not look to any of *Pearson*, *Kimura* or *Shin*, and also would not be motivated to combine these references. Finally, the combination of these references, even were they combinable, would not teach or suggest the claimed invention.

Pearson is not directed to fabric/expanded polymer bead foam laminates, but is directed to protective clothing which contains a porous foam layer in one embodiment, wherein the pores of the foam are filled with activated charcoal so as to be able to absorb toxic chemicals. By their very nature, such products are flexible (they are worn as clothing), and do not contain any foam prepared by expanding polymer beads in a closed mold. As one skilled in the art is well aware, moldings formed from polymer beads are closed cell foams, i.e. they have substantially no porosity. Examples include polystyrene picnic coolers, which contain liquids quite well. However, the foam layers employed by *Pearson* must be porous. Note, for example, column 1, lines 42-48, where the permeability to air flow is stated, and column 2, lines 30-35, where the pore size in relation to the charcoal holding ability is mentioned.

Open pored foams are considerably different than closed cell foams, since the former has a physical surface "roughness" categorized by open pores which the latter does not have. Thus, it is much easier to adhere to open cell foam to other substrates since the adhesive will be able to "grab" the surface. Thus, even adhesives with low adhesiveness can be used with open celled foams, whereas this is not true of expanded polymer bead foam.

Pearson's invention is not directed to using pulverulent adhesives between fabric layers (one of which may be a porous foam), but rather is directed to including activated charcoal between fabric layers to absorb toxins. *Pearson* exemplifies many adhesives, but does not teach or suggest Applicants' adhesive requirements.

Kimura is directed to bonding fabrics together, woven or non-woven (i.e. spun-bonded). *Kimura* is completely silent as to bonding any foam to fabric, much less a closed-cell foam produced by molding expandable polymer beads. *Kimura* teaches a specific terpolymer adhesive of styrene, acrylonitrile, and alkylacrylate, to form a bond which is resistant to dry cleaning (not a concern of Applicants) and to washing at elevated temperatures (also not a concern of Applicants).

At column 3, other comonomers which can be copolymerized are mentioned. However, no amounts are indicated, nor is there any evidence of a minimum T_g disclosed. The Office states that *Kimura* teaches fabric laminate stability greater than 80°C. Applicants find no mention of such thermal stability, particularly at the points cited by the Office, i.e. column 1, lines 28-31 and 48-50 and column 2, lines 12-16 and column 4, lines 55-56. The Office also states that since *Kimura's* adhesives have a melting point of 60--150°C, one skilled in the art would expect the T_g to be above 30°C. This is incorrect, however. For example, the melting points and T_g of several polymers are set forth below:

Polymer	T_m (°C)	T_g (°C)
Polypropylene	176	-19
Polyoxymethylene	180-200	-68
Polyethylene (branched)	105-125	-80
Polyethylene (linear)	137	-20

¹ Source: EXPERIMENTS IN POLYMER SCIENCE, Collins et al., J. Wiley & Sons, N.Y., pp. 222-23.

Thus, while *Kimura* mentions acrylic acid as one potential comonomer, he does so in a list of other potential comonomers as well. In his examples, *Kimura* uses only "straight" copolymers of styrene, acrylate, and acrylonitrile. *Kimura* gives no reason why one would wish to add acrylic acid to his other three monomers. Finally, while *Kimura* teaches that his polymers are suitable for bonding fabrics subject to washing or dry cleaning together,

he does not teach or suggest that fabric/foam composites, particularly the activated charcoal-filled composites which constitute one embodiment of *Pearson*, could be bonded with such polymers.

At best, *Kimura* provides only an invitation to experiment. While the skilled artisan might be motivated to employ *Kimura*'s ternary adhesives to bond fabrics together, *Kimura* does not teach or suggest that his adhesives could bond any type of foam, whether the open pored foam of *Pearson*, or the closed cell foam of Applicants. Moreover, if one employed a *Kimura* adhesive in Applicants' invention, for example the adhesive of his examples, one would have found that the heat resistance at 80-90°C was inferior, and that delamination would require little force. If one were desirous of increasing high temperature adhesion, in which direction would one proceed? *Kimura* offers no direction at all.

Finally, with respect to *Kimura*, all *Kimura* teaches is that styrene/acrylate/acrylonitrile adhesives are useful for bonding fabrics. Applicants' invention is not directed to fabrics, and the composites claimed are neither dry cleaned nor machine washed. One skilled in the art of composite parts would not be motivated to look to *Kimura* for any reason.

There is no evidence of record to combine *Pearson* and *Kimura*. In the case of *In re Anita Dembiczak* and *Benson Zinbarg*, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999), the CAFC has indicated that the requirement for showing the teaching or motivation to combine references is "rigorous." *Dembiczak* at 1617. Moreover, this showing, which is rigorously required, must be "clear and particular." *Dembiczak* at 1617. See also, *C.R. Bard v. M3 Sys., Inc.*, 48 U.S.P.Q.2d 1225, 1232 (Fed. Cir. 1998). It is well established that merely because references can be combined, the mere suitability for logical combination does not provide motivation for the combination. See, *Berghauser v. Dann, Comr. Pats.*, 204 U.S.P.Q. 398 (DCDC 1979); *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 U.S.P.Q. 929 (Fed. Cir. 1984). Moreover, mere conclusory statements supporting the proposed combination, standing alone are not "evidence". *McElmurry v. Arkansas Power & Light Co.*, 27

U.S.P.Q.2d 1129, 1131 (Fed. Cir. 1993). *See also Ecolochem, Inc. v. Southern Cal. Edison Co.*, 56 USPQ2d 1065 (Fed. Cir. 2000); and in particular, *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002).

Pearson is directed to safety garments which are intended for absorption of toxins, not clothes which will be dry cleaned and/or machine washed. Washing an activated charcoal-impregnated fabric or fabric/foam composite would certainly release charcoal particles to the wash water, particularly when these are not also bound by additional adhesive (polyethylene: see *Pearson*, column 2, line 70 to column 3, line 20). At the very least, the organic solvents of dry cleaning and the myriad of compounds of detergents would be adsorbed by the charcoal, rendering it unfit to absorb toxins any longer. Thus, *Pearson* does not suggest the combination. *Kimura* is not directed to any problem solved by *Pearson*, and provides no more motivation to combine than would a simple list of all possible polymer adhesives. Evidence to combine must be clear and particular. Here, there does not appear to be any evidence to combine.

Shin is cited for a polyethylene foam sheet useful for preparing garments. However, *Shin* is not combinable with *Pearson*, because while *Pearson* requires an open celled foam to receive charcoal, the sheet of *Kimura* is produced by the blowing of blowing-agent containing particles by heating such particles until they are molten (i.e. liquid), then continuing heating until the blowing agent is activated. Melting is accomplished in a "tunnel" with a screw, a bad translation of a screw-type extruder. The activating and molten polymer is extruded and allowed to free rise, whereupon a non-porous foam sheet is produced. The sheet may be sandwiched between fabric, but no adhesive is taught or suggested. Rather, the contact is made while the polyethylene is softened, thereby adhering to the fabric. *See*, e.g. *Shin* at column 5, lines 53-65. Note that a principle aim of *Shin* is to produce a polyethylene foam sheet which is highly buoyant (*see*, e.g. column 1, line 66 to column 2, line 11), which can only be met by a closed cell foam. An open cell foam would allow ingress of water, causing the buoyancy to be lost.

As with *Kimura*, there is no motivation to combine *Pearson* with *Shin*. *Kimura* provides no such motivation; *Kimura* is not directed to foams of any kind. *Pearson* provides no motivation; *Pearson* requires open celled foam, while *Shin* produces only closed cell foam. Factually, with respect to the foam component, *Pearson* and *Shin* are diametrically opposed. Each teaches the direct opposite of the other. Here, thus, not only is there no motivation to combine, but moreover, the references are incapable of being combined: their counter teachings cannot be reconciled. In such cases, combination is not legally possible. *In re Avery*, 186 USPQ 161 (CCPA 1975).

Finally, the proposed combination, even were combination proper, does not teach or suggest the subject invention. None of the references teach a foam part produced by molding of expandable polymer beads, which results in a closed cell (smooth, impervious) part. *Pearson* teaches uses of an open celled foam only, and *Shin*, while he teaches a closed cell foam sheet, does not prepare the sheet by expanding expandable polymer beads in a mold. Rather, *Shin* extrudes polyethylene containing a blowing agent and allows the hot, molten expanding mass to expand, with no mold present.

Second, none of the references teaches or suggests that the polymer adhesive T_g be greater than 30°C, and as Applicants indicated previously, there is no relationship between T_g and T_m which would necessitate a high T_m polymer to have a high T_g . None of the references teach or suggest this requirement.

Finally, none of the references teach or suggest adding an unsaturated carboxylic acid to increase thermal delamination stability. Only *Kimura* mentions acrylic acid, and then only in a list of potential monomers. *Kimura* provides no reason why acrylic acid should be included, or should be used in lieu of other monomers he lists. One skilled in the art is well aware of publications which list hundreds of possible comonomers. The existence of *Kimura* or other such references does not lead one to any particular polymer. It only makes it "obvious to try" if anything. However, this is not the standard of patentability. *In re Antonie*, 195 USQP 6 (CCPA 1977); *Jones v. Hardy*, 220 USPQ 1021 (Fed. Cir. 1984). With

respect to dependent claims which claim particular copolymers, the lack of relevance of the cited combination of references is yet more clear.

Withdrawal of the rejection of claims 16, 22, 23, and 26-30 over *Pearson*, *Kimura*, and *Shin* is solicited.

Claims 16 and 25-29 have been rejected under 35 U.S.C. § 103(a) over *Pearson* in view of *Lauchenaue* U.S. Patent 3,922,418 ("*Lauchenaue*"). Applicants respectfully traverse this rejection for substantially the same reasons as the prior rejection. Again, *Pearson* requires open celled foam while *Shin* discloses only a closed cell foam. *Lauchenaue* is directed to adhesives which are crosslinkable by addition of a crosslinking compound. As indicated previously, the claims of the present application are directed to adhesive polymers which are not crosslinked by a separate crosslinker as required by *Lauchenaue*. Thus, for example, *Lauchenaue* discloses polyolefins also containing acrylic acid monomers, with polyols, polyvalent cations, or amines as crosslinkers. However, polyethylene adhesives, even those containing acrylic acid, are outside the scope of the present application. Polyethylenes are not suitable adhesives.

Lauchenaue does not disclose use of acrylic acid in polyacrylate or other polymers; only with polyolefins. Thus, the proposed combination entirely fails to teach or suggest the present invention, as the type of expanded polymer bead molding is not taught; the type of adhesive not taught; the adhesive T_g is not taught; and the use of acrylic acid is a comonomer with the claimed adhesives is not taught. Withdrawal of the rejection under § 103(a) over *Pearson* in view of *Lauchenaue* and *Shin* is solicited.

As a final comment, although the Office states that *Pearson*'s lack of specificity regarding adhesive type implies that any adhesive is useful (despite the differences between *Pearson*, the subject invention and the other references, discussed earlier), Applicants' comparative example shows that this is surprisingly not so. Polyethylene powder, widely used

as an adhesive, fails to produce a useable product. Thus, the discovery of certain adhesives which do function is surprising and unexpected, as noted in the present application.

Applicants submit that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, the Examiner is highly encouraged to telephone Applicants' attorney at the number given below.

Respectfully submitted,

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Date: June 15, 2004

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